REMARKS

This application has been reviewed in light of the Final Office Action mailed on May 20, 2003. Claims 1-31 are pending in the application with Claims 1, 13, 21 and 23 being in independent form. By the present amendment, Claims 1, 2, 11, 13, 21 and 23 have been amended in a manner suggested by the Examiner in the Final Office Action on page 6. No new matter or issues are believed to be introduced by the amendments.

I. Rejection of Claims 1-9 and 13-22 Under 35 U.S.C. §103(a)

In the Office Action, Claims 1-9 and 13-22 were rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,814,827 issued to Katz on September 29, 1998 ("Katz"). Applicants have amended independent Claims 1, 13 and 21 in a manner which is believed to better define Applicants' invention and which obviates the rejection.

Specifically, Applicants' Claim 1 has been amended to recite "An apparatus for an optical code reader comprising: a first solid state photo sensor array having cells arranged in a line along a plane of the array for producing electronic signals corresponding to an image of at least a portion of a target optical code symbol; a second solid state photo sensor array having cells arranged in a line along a plane of the second solid state photo sensor array, planes extending from the planes of the first and second solid state photo sensor arrays form an intersecting angle with respect to each other, the second sensor array for producing electronic signals corresponding to at least a portion of a target optical code symbol; and electronic analog to digital converter means for converting electronic signals from at least one of said sensor arrays to bit content of a target optical code symbol to be read." (Emphasis added)

Applicants' Claim 13 has been amended to recite "A sensor assembly for an apparatus for reading a target one-dimensional optical code symbol whose principle axis has an arbitrary orientation in a plane generally parallel to an image plane of the sensor assembly comprising: a first solid state photo sensor array having cells arranged in a generally straight line along a plane for producing an electronic signal corresponding to at least a portion of an image of the code symbol; a second solid state photo sensor array having cells arranged in a generally straight line along a plane of the second solid state photo sensor array for producing an electronic signal corresponding to at least a portion of an image of the code symbol; a third solid state photo sensor array having cells arranged in a generally straight line along a plane of the third solid state photo sensor array for producing an electronic signal corresponding to at least a portion of an image of the code symbol, wherein planes extending from the planes of the first, second and third solid state photo sensor arrays form intersecting angles with respect to one another; means for focusing images of the target code symbol on each of the three sensor arrays; and means for converting to digital form electronic signals from the sensor assembly." (Emphasis added)

Applicants' Claim 21 has been amended to recite "An apparatus for an optical code reader comprising: at least three one-dimensional solid state sensor elements each having an array of cells, each array located along a plane, wherein the planes form an intersecting angle with respect to one another; electronic analog to digital converters associated with each one-dimensional solid state sensor elements for converting electronic signals from the photo sensors to digital form; and means for selecting a signal from one of the analog to digital converters representative of the data content of a one-

dimensional target bar code whose principle axis is sufficiently aligned with the axis of the corresponding array to permit data to be extracted." (Emphasis added)

Katz is directed to a scanner which achieves an extended depth of focus by employing a multifocal optical system. The scanner comprises a collection optical system for collecting radiation reflected from objects in its field of view along plural different optical axes and optical detector means for detecting radiation collected by the collection optical system along each of the plural different optical axes and for generating electrical output signals indicative thereof. The optical detector means has separate detecting units corresponding to the number of different optical axes of the optical system. With reference to FIGS. 2 and 3, detectors A, B and C are arranged parallel to one another. Accordingly, Katz does not disclose or suggest two or more detectors each having cells arranged in a line along a plane of its respective detector, where the planes form an intersecting angle with respect to one another, as recited by Applicants' claims.

Specifically, Katz does not disclose or suggest at least two solid state photo sensor arrays each having cells arranged in a line along a plane of its respective array for producing electronic signals corresponding to an image of at least a portion of a target optical code symbol and planes extending from the planes of the solid state photo sensor arrays form an intersecting angle with respect to each other, as recited by Applicants' Claims 1 and 13, or that each array is located along a plane and the planes form an intersecting angle with respect to one another, as recited by Applicants' Claim 21.

The Office Action further states that the "art of Katz teaches that the sensor arrays may be of different position planes." Applicants respectfully request the Examiner to cite a specific reference which discloses sensor arrays positioned at different angles with

respect to each other, such that each sensor array has cells arranged in a line along a plane and where the planes of each sensor array form an intersecting angle with respect to one another, as recited by Applicants' claims.

Accordingly, withdrawal of the rejection under 35 U.S.C. §103(a) with respect to Claims 1, 13 and 21 and allowance thereof are respectfully requested.

Applicants' dependent Claims 2, 6, 7 and 22 contain patentable subject matter. It is respectfully submitted that Katz does not disclose or suggest three sensor arrays in which one of the sensor arrays has cells arranged in a line along a plane thereof and the plane forms an acute angle with respect to at least one plane of two other sensor arrays, as recited by Applicants' Claim 2. Further, it is respectfully submitted that Katz does not disclose or suggest lines of three photo sensor arrays being oriented at an angle of about 60 degrees with respect to one another, as recited by Applicants' Claim 6. Further still, it is respectfully submitted that Katz does not disclose or suggest lines of each of three photo sensor arrays lying along one side of an equilateral triangle, respectively, as recited by Applicants' Claim 7. Therefore, Applicants respectfully submit that the limitations of Claims 2, 6 and 7, taken together with the limitations of Claim 1, are patentably distinct over the disclosure of Katz.

Additionally, Katz does not disclose or suggest data content from more than one sensor element being combined to decode a bar code that is positioned such that only a part of the bar code is readable by each sensor element, as recited by Applicants' Claim 22. Therefore, Applicants respectfully submit that the limitations of Claim 22, taken together with the limitations of Claim 21, are patentably distinct over the disclosure of Katz.

Applicants' dependent Claims 3-5, 8 and 9, as well as dependent Claims 2, 6, 7 and 22, depend from either Claim 1 or 21, and therefore include the limitations of Claims 1 and 21. Therefore, for at least the same reasons given above for Claims 1 and 21, Claims 2-9 and 22 are believed to be allowable over the cited reference. Accordingly, withdrawal of the rejection under 35 U.S.C. §103(a) with respect to Claims 2-9 and 22 and allowance thereof are respectfully requested.

II. Rejection of Claims 10-12 Under 35 U.S.C. §103(a)

Claims 10-12 were rejected under 35 U.S.C. §103(a) over Katz in view of U.S. Patent No. 5,920,061 issued to Feng on July 6, 1999 ("Feng").

Applicants' dependent Claims 10-12 depend from Claim 1, and therefore include the limitations of Claim 1. Therefore, for at least the same reasons given above for Claim 1, Claims 10-12 are believed to be allowable over the cited references, taken alone or in combination. Accordingly, withdrawal of the rejection under 35 U.S.C. §103(a) with respect to Claims 10-12 and allowance thereof are respectfully requested.

III. Rejection of Claims 23-31 Under 35 U.S.C. §103(a)

Claims 23-31 were rejected under 35 U.S.C. §103(a) over Katz as modified by Feng, and further in view of U.S. Patent No. 5,818,028 issued to Meyerson et al. on October 6, 1998 ("Meyerson et al.").

Applicants have amended independent Claim 23 in a manner which is believed to better define Applicants' invention and which obviates the rejection. Claim 23 has been amended to include limitations similar to the limitations of Claims 1, 13 and 21. Specifically, Applicants' Claim 23 has been amended to recite "An optical code reader comprising: a gun-shaped housing comprising a head portion containing a sensor

assembly for reading an optical code located forward of and in the vicinity of an optical axis of a sensor assembly, said sensor assembly including at least two sensor elements each having an array of cells, each array located along a plane, wherein the planes form an intersecting angle with respect to one another, said housing further comprising a handle portion sloping backwardly and downwardly from the head portion, said handle portion having a trigger for actuating the optical code reader; and a circuit board generally perpendicular to the optical axis of the sensor assembly extending through the head portion and through at least a portion of the length of the handle portion of the housing for carrying the sensor assembly." (Emphasis added)

As stated in Section I above, Katz does not disclose or suggest at least two sensor elements each having an array of cells, where each array is located along a plane and the planes form an intersecting angle with respect to one another, as recited by Applicants' Claim 23.

Feng and Meyerson et al., taken alone or in combination, do not cure the deficiencies of Katz. Feng and Meyerson et al. do not disclose or suggest at least the newly added limitations to Claim 23. Feng and Meyerson et al., taken alone or in combination, do not disclose or suggest at least two sensor elements each having an array of cells, where each array is located along a plane and the planes form an intersecting angle with respect to one another, as recited by Applicants' Claim 23.

Accordingly, withdrawal of the rejection under 35 U.S.C. §103(a) with respect to Claim 23 and allowance thereof are respectfully requested. Applicants' dependent Claims 24-31 depend from Claim 23, and therefore include the limitations of Claim 23. Therefore, for at least the same reasons given above for Claim 23, Claims 24-31 are

believed to be allowable over the cited references. Accordingly, withdrawal of the rejection under 35 U.S.C. §103(a) with respect to Claims 24-31 and allowance thereof are respectfully requested.

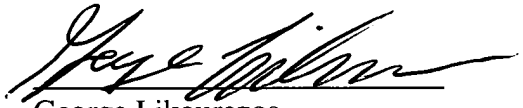
IV. Conclusion

In view of the foregoing amendments and remarks, it is respectfully submitted that all claims presently pending in the application, namely, Claims 1-31, are believed to be in condition for allowance and patentably distinguishable over the art of record.

Attached hereto and identified as VERSION WITH MARKINGS TO SHOW CHANGES MADE is a copy of the amended claims detailing the amendments made thereto.

If the Examiner should have any questions concerning this communication or feels that an interview would be helpful, the Examiner is requested to call Applicants' undersigned attorney at the number indicated below.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 1, 2, 11, 13, 21 and 23 showing amendments made:

1. (Twice Amended) An apparatus for an optical code reader comprising:

a first solid state photo sensor array having cells arranged in a line along [an axis] a plane of the array for producing electronic signals corresponding to an image of at least a portion of a target optical code symbol;

a second solid state photo sensor array having cells arranged in a line along [an axis substantially identical to the axis of the first] a plane of the second solid state photo sensor array, [said axes are oriented at] planes extending from the planes of the first and second solid state photo sensor arrays form an intersecting angle with respect to each other, the second sensor array for producing electronic signals corresponding to at least a portion of a target optical code symbol; and

electronic analog to digital converter means for converting electronic signals from at least one of said sensor arrays to bit content of a target optical code symbol to be read.

2. (Twice Amended) The apparatus of claim 1 further comprising a third solid state photo sensor array having cells arranged in a line along a plane of the third solid state photo sensor array, said plane of the third solid state photo sensor array forming [oriented at] an acute angle with respect to [the lines of the] at least one plane of the first and second sensor arrays.

11. (Amended) The apparatus of claim [11] 10 wherein the aiming beam producing means and the sensor arrays are formed on the same semiconductor die.

13. (Twice Amended) A sensor assembly for an apparatus for reading a target one-dimensional optical code symbol whose principle axis has an arbitrary orientation in a plane generally parallel to an image plane of the sensor assembly comprising:

a first solid state photo sensor array having cells arranged in a generally straight line along [an axis] a plane for producing an electronic signal corresponding to at least a portion of an image of the code symbol;

a second solid state photo sensor array having cells arranged in a generally straight line along [an axis substantially identical to the axis of the first] a plane of the second solid state photo sensor array for producing an electronic signal corresponding to at least a portion of an image of the code symbol;

a third solid state photo sensor array having cells arranged in a generally straight line along [an axis substantially identical to the axes of the first and second sensor arrays] a plane of the third solid state photo sensor array for producing an electronic signal corresponding to at least a portion of an image of the code symbol, wherein [the axes of the first, second and third sensor arrays] planes extending from the planes of the first, second and third solid state photo sensor arrays form [are oriented at an] intersecting angles with respect to one another;

means for focusing images of the target code symbol on each of the three sensor arrays; and

means for converting to digital form electronic signals from the sensor assembly.

21. (Twice Amended) An apparatus for an optical code reader comprising:

at least three one-dimensional solid state sensor elements each having an array of cells, each array located along [an axis] a plane, wherein the [axes are oriented at] planes form an intersecting angle with respect to one another;

electronic analog to digital converters associated with each one-dimensional solid state sensor elements for converting electronic signals from the photo sensors to digital form; and

means for selecting a signal from one of the analog to digital converters representative of the data content of a one-dimensional target bar code whose principle axis is sufficiently aligned with the axis of the corresponding array to permit data to be extracted.

23. (Twice Amended) An optical code reader comprising:

a gun-shaped housing comprising a head portion containing a sensor assembly for reading an optical code located forward of and in the vicinity of an optical axis of a sensor assembly, said sensor assembly including at least two sensor elements each having an array of cells, each array located along [an axis] a plane, wherein the [axes are oriented at] planes form an intersecting angle with respect to one another, said housing further comprising a handle portion sloping backwardly and downwardly from the head portion, said handle portion having a trigger for actuating the optical code reader; and

a circuit board generally perpendicular to the optical axis of the sensor assembly extending through the head portion and through at least a portion of the length of the handle portion of the housing for carrying the sensor assembly.